



# **CITY OF RIO VISTA**

## **2010**

### **URBAN WATER MANAGEMENT PLAN**

PREPARED FOR  
CITY OF RIO VISTA  
PUBLIC WORKS DEPARTMENT

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**City of Rio Vista Urban Water Management Plan 2010**

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## **City of Rio Vista Urban Water Management Plan 2010**

### **1. Introduction:**

Water Code sections 10620 and 10621 require all “urban water suppliers” to prepare and adopt an urban water management plan and to update that plan every five years. Due to recent increases in its population, the City of Rio Vista (City) now qualifies as an urban water supplier as defined in California Water Code section 10617 because the City is a public agency directly providing water for municipal purposes to more than 3,000 customers. Accordingly, the City has prepared this Urban Water Management Plan (UWMP).

This UWMP has been prepared in conformance with the California Urban Water Management Planning Act, Water Code section 10610 et seq. (UWMP Act). In Water Code section 10610.4 of the Act, the Legislature declared:

- (a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.
- (b) The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.
- (c) Urban water suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies.

The Legislature has amended the UWMP Act several times, most recently in 2009. The 2009 amendments added several additional requirements and elements to urban water management plans. As these amendments signify, urban water management is an increasingly complex field and can be very costly depending on the technology and precision desired. However, the level of precision and sophistication required by a particular water supplier depends largely on the size of the water service area and the complexity of the water supplies and infrastructure used to acquire, store, treat, and convey those supplies to individual water users within that supplier’s service area. In general, the larger and more diverse a water supplier’s system, service area, and population are, the more cost and effort required and invested in water planning. The Legislature recognized this reality by stating that its intent in enacting the UWMP Act was “to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.” Water Code § 10630.

#### **1.1 Coordination**

During the preparation of the 2010 UWMP, the City coordinated and exchanged information with Solano County and the Solano County Water Agency. Solano County was contacted 60 days prior to a public hearing to review the 2010 UWMP, and 60 days after the submission of the 2010 UWMP to the California Department of Water Resources (DWR) as per California Water Code sections 10621(b) and 10635 (b). *See Supporting Documents and Correspondence in Appendix A and Table 1 in Appendix E.*

## 1.2 Plan Adoption, Submittal, and Implementation

As indicated, the UWMP Act requires each urban water supplier to adopt and implement its UWMP every five years. This process involves public review of the UWMP, revisions, and adoption by the governing body of the water supplier. Rio Vista's 2010 UWMP will be available for public review at the Public Works Department at Rio Vista City Hall after adoption and submission to the California Department of Water Resources. Water Code § 10645. The City's 2010 draft UWMP was reviewed by the City Council and general public during a public review meeting at the June 16, 2011 City Council Meeting.

The Rio Vista City Council adopted the 2010 UWMP by resolution at its August 18, 2011 public meeting. *See Resolution to Adopt the 2010 UWMP in Appendix A.*

The 2010 UWMP will be sent to DWR, the California State Library, and Solano County within 30 days after adoption. *California Water Code section 10644(a). See Supporting Documents Appendix A.*

## 2. System Description:

### 2.1 Service Area Physical Description

The City of Rio Vista is located 48 miles southwest of Sacramento and 65 miles northeast of San Francisco. The City was incorporated on December 30, 1893. There are currently 4,225 acres of land within the City's water service boundary, of which 2,213 are currently developed. *See Water Service Boundary Map in Appendix D.*

The City provides a small town atmosphere that includes a mix of rural and suburban lifestyles, but provides easy access to the larger urban amenities found in San Francisco and Sacramento. Rio Vista lies on the banks of the Sacramento River and is an easy drive to the Napa Wine Country, Sierra ski resorts, and Lake Tahoe.

In addition to the town proper, the City's Planning Area includes unincorporated surrounding areas located within the City's sphere of influence. These unincorporated areas may, in the future, request services from, or annexation to the City. The City's full planning area includes approximately 4,225 acres of unincorporated land.

The table below shows climatic information. The average rainfall and average temperature information comes from the National Weather Service from the Antioch Pump Plant 3 data center (period of record 1955 – 2010). The evapotranspiration data comes from the Twitchell Island California Irrigation Management Information System (CIMIS) Station.

#### Climate

	Jan	Feb	Mar	Apr	May	Jun	
Standard Monthly Avg. ETo	1.59	2.20	3.65	5.08	6.83	7.80	
Avg Rainfall (inches)	2.80	2.43	1.93	0.88	0.38	0.10	

Ave Temp (F)	45.3	50.6	54.4	58.8	64.85	71.1	
	<b>July</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>	<b>Annual</b>
Standard Monthly Avg. ETo	8.67	7.81	5.67	4.03	2.12	1.59	57.06
Avg Rainfall (inches)	0.02	0.05	0.21	0.70	1.66	2.12	13.28
Avg Temp (F)	74.1	7.34	70.7	63.9	53.5	45.9	60.5

## 2.2 Service Area Population

Water Code section 10631(a) requires projected population estimates in five year intervals. Table 2 presents the current and projected population of the City through 2030. As indicated, between 2010 and 2030, the City's population is expected to almost double, increasing from 8,324 to 14,600 residents. The City obtained these population estimates from the State of California Department of Finance and the Association of Bay Area Governments. *See Table 2 in Appendix E.*

Solano County requires that any urban development be annexed to a city (Solano County Orderly Growth Initiative, 1994). There are no urban populations in the unincorporated areas of Solano County. This initiative will continue to place annexation pressure on the City as undeveloped areas in the City's sphere of influence continue to develop.

## 3. System Demands:

### 3.1 Water Demands

Residential consumption was, is, and will continue to be the primary beneficial use of water served by the City. Other beneficial uses include commercial and governmental functions within the City.

The City does not currently sell any water supplies to other agencies and it has no plans to do so in the future. The City does not incur additional water losses or use water for the creation of saline groundwater barriers, groundwater recharging, or water recycling. The City monitors its water supply and infrastructure, and is constantly engaged in repairing and maintaining that infrastructure. However, the City does not currently have the resources to establish a program for determining overall system losses. Any system losses that occur would, however, be reflected and incorporated into the City's overall water use and pumping data. *See Tables 3-7, 9-11 in Appendix E.*

### Planned Growth and Development

The City adopted its most recent General Plan on July 18, 2002. Among other land uses, that plan included zoning for residential, commercial, and industrial development. As these developments are proposed, constructed, and come on line, they will comprise much of the City's projected increase in population and water demands. Several projects that could

significantly contribute to the City's future projected population and water demand growth have been proposed and are currently in the City application and/or environmental review stages. These include:

- The Del Rio Hills project, a mixed use project consisting of up to 2,500 residential units and 315,000 square feet of commercial uses, as well as required schools and parks, on approximately 505 acres in the City of Rio Vista, immediately east of unincorporated Solano County.
- Brann Ranch Project: Approximately 860 single-family dwellings are planned in this residential development located south of Liberty Subdivision, between Highway 12 and Liberty Island Road.
- Liberty Project: Approximately 929 single-family dwellings are planned in this residential subdivision located northwest of Trilogy, on the westerly side of the City between Liberty Island Road and both sides of McCormack Road.
- Riverwalk Project: Riverwalk is an approved 236-acre Planned Unit Development north and east of the intersection of Highway 12 and Church Road. The Riverwalk Project would consist of approximately 783 single-family homes and 240 multi-family residential units, as well as commercial and open space development. The project is proposed to be carried out in six phase.

As stated, these developments were included in the City's future water use projections in this UWMP because they represent reasonably foreseeable planned growth within the City's current zoning as adopted in its current General Plan. As these developments get closer to completion, additional water supply analyses will likely be performed pursuant to the California Environmental Quality Act process and other California water adequacy laws (e.g., SB 610, SB 221, etc.).

### **3.2 Baselines and Targets**

Baseline and Target numbers were based on the requirements outlined in the 2010 Urban Water Management Guidebook, Section II, part M. As shown in Tables 13 and 14, the City's base daily per capita water use for the 10-year period 2000-2009 was 320 gpcd. During the 5-year period 2005-2009, the base daily per capita water use declined slightly to 314 gpcd. The City used the metered water pumping data obtained at the individual well sites located in the service area. The aggregate total is reflected in the tables used to determine baselines and targets. *See Tables 13 and 15 in Appendix E.*

Based on Methodology 3 – Base Daily Per Capita Water Use, the City of Rio Vista has a 2020 gpcd target of 256 gpcd. The City's minimum water use reduction requirement is 298 gpcd. In 2009, the City's daily per capita water use was 274 gpcd, which serves as the compliance daily per capita water use value for the last year in the reporting period.

### **3.3 Water Demand Projections**

Rio Vista does not currently and does not intend to rely on any wholesale water distributor to meet demands through 2030. Therefore, no projected data has been provided to any wholesale water agency and Table 12 contains no estimates of such reliance. Water Code § 10631(k). *See Table 12 in Appendix E.* It should be noted, however, that as explained in Section 4.1 and 4.3, the City has a contract right to up to 1,500 acre-feet from the Solano County Water Agency North Bay Aqueduct deliveries of State Water Project supplies, which may offer innovative means to deal with unexpected supply shortages, even though not technically available until 2016 and not projected to be needed to meet planned growth through 2030.

### **3.4 Water Use Reduction Plan**

Water Code section 10608.36 requires urban wholesale water suppliers to include in their UWMPs an assessment of present and proposed measures to help achieve the intended water use reductions. The City is not a wholesale water supplier and thus this discussion is not required, however, it is important to note that the City is in the process of retrofitting, and installing water meters, especially among its residential accounts. These unmetered residential users comprise a large percentage of the City's overall water use. Commercial and Industrial users have historically been metered. Metering will greatly improve the City's ability to monitor and manage residential demand. Metering has been shown to make water users more conscious of their water use and to foster conservation, often leading to reductions in per capita use. Furthermore, if necessary, a tiered rate structure that eliminates waste or unreasonable uses of water could be implemented. Such rate structures have historically been shown to be effective in reducing wasteful or excessive water use practices and reducing per capita daily use.

## **4. System Supplies:**

### **4.1 Water Sources**

The City has eight operating supply wells providing water for the entire system. The most recent well (Well 14) was constructed in the northwest portion of the City, primarily to serve the Trilogy development. After installation, however, Well 14 has at times provided the majority of the City's water supply. For instance, from January through April 2007, Well 14 provided an average of 60 percent of the City's total supply.<sup>1</sup> In the second half of 2007, however, Well 13 became the leading pumping well. From May 2007 through November 2007, Well 13 provided nearly half of the City's total supply.<sup>2</sup> The characteristics of the existing wells, including approximate yield, depth, and year of construction are included in Table A below.

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<sup>1</sup> ENGEO, "Progress Report for Hydrogeologic Consultation and Evaluation of Well Data – May 2006 through April 2007". May 18, 2007.

<sup>2</sup> ENGEO, "Progress Report for Evaluation of Water Supply Well Data – September thru November 2007". April 3, 2008.

**TABLE A: CITY OF RIO VISTA EXISTING WATER SUPPLY INFRASTRUCTURE<sup>3</sup>**

Well number	Capacity (gpm)	Installation date	Depth	Screened depths	Notes
7	400	1953	424	86-406	
8	300	1955	492	84-438	Pump tests in 1977 – 1200 gpm capacity, 56 gpm per foot of water table drawdown.
9	900	1963	910	230-780	Benzene water quality impairment.
10	1200	Unknown	520	230-500	Affects nearby private wells at very high withdrawal rates. Pumping rate should not exceed 1000 gpm; arsenic water quality impairment in winter.
11	1100	1995	937	205-273, 315-350	1000 gpm, 150 ft of drawdown; interbedded sand and clay.
12	500	1995	452	380-408, 418-442	700 gpm; in formation with high sensitivity to drawdown; prior reports of sand in drinking water; arsenic water quality impairment.
13	1500	2003	350 (+/-)	300 (+/-)	Capable of 1500 gpm; in formation with high sensitivity to drawdown; 100 hp variable frequency drive pump.
14	1500	Nov-05	350 (+/-)	300 (+/-)	Capable of 1500 – 2000 gpm.
<b>Total</b>	<b>7400</b>				

Rio Vista does not import or export surface water supplies at this time, and it expects to rely on groundwater for the future planning horizon of this UWMP. However, it is important to note that other water supply options are available to the City if needed in the future or in an emergency. Potential supplemental or emergency water sources include the Sacramento River and the North Bay Aqueduct (NBA). An agreement with the Solano County Water Agency (SCWD), which controls the NBA water in Solano County, allows for access to the NBA supplemental water source. However, because Rio Vista is a significant distance from the NBA facility, it is more likely the City would exchange its rights to that water for additional Sacramento River water if needed. Future water sources may include additional wells, recycled water, the Sacramento River, and purchased water from the Solano County Water Agency. For the City to utilize these sources would require additional infrastructure. *See Tables 16 and 17 in Appendix E.*

<sup>3</sup> Source: ENGEO. “Memo to the City of Rio Vista: Hydrogeologic and Available Water Supply Trend Analysis”. October 6, 2006. ENGEO. Groundwater Evaluation, City of Rio Vista. June 21, 2002.

## 4.2 Groundwater Source

The City draws its water supply from the Solano subbasin at the southeastern limit of the Sacramento Valley Groundwater Basin. This groundwater basin is currently not adjudicated.

The Solano subbasin is bounded by the Sacramento River to the east, Putah Creek on the north, and the North Mokelumne and San Joaquin rivers on the south and southeast. The western edge of the basin is defined by the hydrologic divide between the Sacramento River and the San Francisco Bay drainages. The Suisun-Fairfield groundwater basin lies immediately to the west of the Solano subbasin. The Solano subbasin also contains at least two distinct freshwater-bearing zones: an upper alluvial layer, ranging from 60-130 feet thick; and the thicker Tehama formation, which provides most of the groundwater used in the area. Additional saline water-bearing formations underlie the Tehama formation. Primary waterways in and bordering the basin include the Sacramento, Mokelumne, and San Joaquin Rivers, the Sacramento River Deep Water Ship Channel, and Putah Creek.

Wells in the upper alluvium can provide substantial yields when situated near the Sacramento River; otherwise, these shallower wells can be relatively low-yielding. Most wells in the Solano subbasin tap the Tehama formation, which ranges from 1,500-2,500 feet thick, and can also provide very high yields of several thousand gallons per minute per well. The USGS has developed some localized groundwater yield and storage estimates, although those estimates do not apply to the full Solano subbasin or the Tehama formation within Solano County. Appendix A provides the full Solano groundwater subbasin description, from DWR's Bulletin 118 Update.

Within the Solano subbasin, all the basin's municipal groundwater users either have GMPs, or are currently monitoring or studying the groundwater in some manner. The City of Rio Vista and the City of Dixon are engaged in groundwater monitoring and study efforts. The City of Vacaville, Solano Irrigation District (SID), MPWD, and Reclamation District 2068 have adopted groundwater management plans.

In addition, some rural residential landowners have individual shallow groundwater wells that serve their domestic needs. There are also some small rural residential water systems that distribute groundwater to their customers.<sup>4</sup> The SCWA Integrated Regional Water Management Plan (IRWMP) estimates the groundwater basin supply to be 23,300 acre feet annually (AFA).<sup>5</sup> There is no trend of groundwater overdraft with current levels of groundwater use.<sup>6</sup>

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<sup>4</sup> Solano County Water Agency. February 2005. Appendix A of *Integrated Regional Water Management Plan and Strategic Plan*.

<sup>5</sup> Solano County Water Agency. February 2005. *Integrated Regional Water Management Plan and Strategic Plan*, p. 3-8.

<sup>6</sup> Solano County Water Agency. February 2005. *Integrated Regional Water Management Plan and Strategic Plan*, p. 3-6.

Average annual precipitation in the basin ranges from approximately 23 inches in the western portion of the subbasin to 16 inches in the eastern portion of the basin. (*California Bulletin 118*).

The City commissioned *ENGEO Incorporated* to prepare a 2002 report titled *Groundwater Evaluation for Rio Vista*. The report reevaluated the groundwater basin in and around the City limits to help determine the future capability of providing water for existing and planned developments. The report concludes that the groundwater basin will likely meet the future groundwater demands established by the projected population growth for the next 20 years. Monitoring the static and pumping levels of the wells in order to better understand the impacts of the increased demand on the aquifer is recommended. Since February 2005, the City has contracted with ENGEO to collect and analyze well monitoring data. Over 60 months of well data have been collected and synthesized. This monitoring indicates that groundwater levels at various wells may fluctuate during particular months or seasonally according to the City's operational use of its array of wells, but that overall well levels and trends remain stable. More data on this monitoring effort is reported below.

California Bulletin 118 discusses the Solano subbasin in detail. There is currently no calculated groundwater budget for the Solano subbasin. A groundwater management plan has not been prepared for the Solano groundwater subbasin. California Bulletin 160, *California Water Plan Update 2005* also provides no indication that the basin is in overdraft conditions.

Water volumes that have been obtained from the service area wells can be found on Table 18 of this report. In addition the volumes that are projected to be pumped are shown on Table 19 of this report. *See Tables 18 and 19 in Appendix E.*

### **4.3 Transfer Opportunities**

Being surrounded by agricultural land, there are no active municipal water supply systems adjacent to the city. Transfer and exchange opportunities are, therefore, limited.

As a member of the Solano County Water Authority, the City of Rio Vista eventually will hold rights to up to 1,500 acre feet of water from the North Bay Aqueduct (NBA). It is important to note that the 1,500 acre-foot value is a maximum amount that would vary depending on hydrology and State Water Project (SWP) allocation. Currently, the SWP estimates that on average it can deliver approximately 60-70 percent of full contractual amounts. (See SWP Reliability Report issued by DWR.) However, the City's location is some distance from an available NBA connection. This makes it unlikely that the City will use the NBA as a direct source of water supply because the cost to construct intertie and conveyance facilities would be very costly considering the City's population and funding. However, the possibility exists for the City to make an agreement to transfer or exchange this contractual water right for Sacramento River water diversions with the Solano County Water Agency or another entity within its service area. Even in such a scenario, the City would need to develop infrastructure to divert and use the Sacramento River water. Because of the additional costs of infrastructure and the fact that the City's existing groundwater supplies are considered adequate to provide reliable water supplies throughout the planning horizon of this UWMP, these additional supplies are not needed to meet future, projected demands. These opportunities for additional supplies are mentioned here in the spirit of full disclosure and compliance with the UWMP Act, and for

purposes of documenting that if an emergency need arises, or if future City water demands unforeseeably increase substantially above those projected here, the NBA or Sacramento River supplies could be developed. In an emergency, the costs of temporary infrastructure would likely be less than permanent facilities and funding could be provided by the state or federal government.

*See Table 20 in Appendix E.*

#### **4.4 Desalinated Water Opportunities**

The City is not located near a supply of water high in total dissolved solids (TDS) that would warrant or allow for the development of a desalination facility; therefore, desalinated water is not feasible and is not discussed further in this plan.

#### **4.5 Recycled Water Opportunities**

Because of the City's small size and the relatively abundant groundwater supplies that it has enjoyed, there has been little effort historically to develop or utilize recycled water. However, the City has considered and would be amenable to recycled water use in the future. The City of Rio Vista has two waste water treatment plants. Information for the volumes of effluent treated can be found in Tables 21 and 23 in Appendix E. As indicated, the total amount of effluent treated is 235.4 million gallons of waste water per year. Only one-third is treated to drinking water standards but due to the lack of redundancy in the process, it is not considered up to drinking water standards. No water from these two treatment facilities is currently being recycled and used within the service area boundaries. All treated water is currently discharged into the Sacramento River.

Potential recycled water customers exist in the City and surrounding areas. In the future, the City hopes to develop these opportunities if they are cost effective. For instance, local agriculture would be the largest potential user of recycled water. Other potential applications for recycled water include green belts and common areas in large developments as they are built. For instance, the Trilogy development and its surrounding golf course are intended to be a primary user of recycled water. Infrastructure has been installed; however, more development will be needed to fully implement the usage of non-potable recycled water at that location and future locations around the City. Additionally, the Del Rio Hills PUD has a potential recycled water demand of approximately 340 AFA to serve landscape areas, open space, and roadway irrigation. The City currently does not have the funding to develop all possible recycled water infrastructure, but is actively seeking and will continue to seek out innovative funding and grant opportunities from private and government sources.

#### **4.6 Future Water Projects**

At this time, the City has no projects for the development of additional water supply planned. The current array of wells is expected to meet short-term water demands. However, as demands increase, the City will monitor existing groundwater well production and capacity and construct additional wells if needed to satisfy future demands in the service area. The City's 2003 Water Master Plan projected that approximately 15 wells would be required to meet future full planned growth and development. This would involve adding nine 1,000 gpm wells to the City's existing

system. As mentioned earlier, the City has contracted for ongoing well monitoring and reporting with ENGEO, Incorporated.

*See Table 26 in Appendix E.*

## **5. Water Supply Reliability and Water Shortage Contingency Planning:**

### **5.1 Water Supply Reliability**

The City has a single source of water, the Solano groundwater subbasin. The City has used this supply since the City was incorporated in 1893. Historically, the City's groundwater supply has been able to fully satisfy demand during single-year and extended-period droughts. For the reasons explained below, the City concludes that it can meet current and future demands with its existing groundwater supply (subject to development of additional wells if needed). Because the groundwater basin does not have a water budget, and the City is experiencing a lull in development, this UWMP uses an increase in water usage (gpcd) based on a 10 year average of water delivered and projected to the year 2020. *See Tables 27 and 28 in Appendix E.*

Based on historical pumping records and ongoing monitoring data and regional management programs, the City is confident that its water demands can continue to be met with local groundwater from the Solano subbasin. The history of the basin is valuable to understand this conclusion. Historically, the area overlying the subbasin was used extensively for agricultural production. Early agricultural users relied heavily on groundwater, and over time the aquifer was depleted and groundwater levels lowered. The Solano Project was built to alleviate groundwater concerns and provide a supply of high quality surface water to the region. After construction of the Solano Project, groundwater levels in the basin began to rise. By the 1970s and 1980s, groundwater levels had rebounded substantially. Current groundwater levels across the basin are at or near record highs. Most of the hydrographs show a small decline in water levels over the early 1990s, in response to the 1987-1992 drought, but show that water levels also recovered quickly to pre-drought levels.

Recent records from various monitoring wells in the Rio Vista area indicate that groundwater levels are not in decline across the basin, and the DWR does not consider the basin to be in overdraft. Some well records from the Solano subbasin show water levels at or very near ground surface in recent years. These high water levels suggest that the basin is at the point of rejecting additional recharge. Additionally, for the past five years, the City has conducted, through a contract with ENGEO, a multi-year effort to monitor and report on the water levels, water quality, and overall functioning of the City's existing groundwater wells. Data from this monitoring indicates that groundwater levels are not in decline in the Rio Vista area and that well productivity is high and stable.

Overall, it is also important to note that groundwater is the source of only a small portion of water for other water users and suppliers in this basin. Other water users in the Solano subbasin that currently rely on groundwater for some portion of their supply have other sources to rely on, including the NBA. It is likely that the SCWA member agencies will be able to meet planned demands from these sources and thereby decrease reliance on groundwater. Thus, overall groundwater use in the basin is not anticipated to see a significant increase. For instance, the

Solano Irrigation District's agricultural water use (both surface and groundwater) is likely to decline over the coming 20 years as municipalities convert areas currently used for agriculture into urbanized areas. Additionally, stable groundwater levels indicate that groundwater withdrawal can increase from the estimated current regional demand of 23,300 AFA<sup>7</sup> without causing overdraft of the basin.

If monitoring indicates an increase in groundwater withdrawal is beginning to cause groundwater level declines, conjunctive use planning will enable the area's water suppliers, including the City, to limit groundwater withdrawal to sustainable levels. For example, Rio Vista may be able to exchange surface water allocations or purchased supplies with other groundwater users via in-lieu use arrangements. Under such arrangements, the other users would then reduce groundwater pumping to allow Rio Vista to increase withdrawals without causing basin-wide overdraft. In some years, when surface water supplies are limited, more groundwater may be withdrawn, but on a long-term basis groundwater use in the basin can be managed at sustainable levels for the City's anticipated growth. Groundwater management efforts, adequate overall regional supplies, and the ability of the SCWA agencies to exchange and purchase additional surface water supplies will enable proactive management of groundwater supplies over the coming 20 years.

## **5.2 Water Shortage Contingency Planning**

The City does not currently have a Water Shortage Contingency resolution. A draft resolution is attached in Appendix B, as required in Water Code section 10632(a)(8). As explained elsewhere, a large majority of the City's current water users are not metered. To comply with the mandates of California law, the City intends to convert existing users to meters and meter water usage at these sites in the future. Once meters are installed, the City will consider plans and effective strategies to reduce and apportion water supplies and demands during any water shortage. As explained above, however, the City does not anticipate future water shortages due to supply limitations because the City uses groundwater exclusively for its supply, and therefore the City deems a catastrophic supply interruption very unlikely. One supply interruption scenario could involve a regional power outage, which the City does not expect would last beyond a few days at the most. In that event, the City has back-up generators at each of its well sites to provide the necessary power for continued well operation. To cope with other temporary interruptions in supply, it is important to note that the City has water storage tanks at high elevation points to meet instantaneous demands. Water would be delivered via gravity feed to existing customers. In the event of any catastrophe, the City would immediately notify residents to reduce water use and ration supplies. City buildings and City owned facilities would also discontinue or limit water use.

Water Code section 10632 requires that the City provide "an estimate of the minimum water supply available during each of the next three years based on the driest three-year historic sequence for the agency's water supply." The City does not have specific data regarding the driest three year sequence in its history. In fact, it can be argued what three-year sequence was

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<sup>7</sup> Based on recent historical groundwater use from Dixon, Rio Vista, Vacaville and SID. SID and Vacaville planned demands are anticipated to be met primarily with increased surface water supplies. Solano County Water Agency. February 2005. Appendix A of the *Integrated Regional Water Management Plan and Strategic Plan*.

the driest. Potential periods of notably dry hydrology include 1927-1934, 1975-1977, 1987-1992, and 2008-2010. Given the lack of data from the prior periods, the City has chosen to provide data from the most recent period 2008-2010 because water supply data are available and this period represents a very recent, very dry three-year hydrologic sequence that involved emergency declarations at both the state and local levels. Table 18 indicates that the City pumped an average of 2,704 acre-feet during this period. This amount was adequate to meet demands in those years and did not cause any overdraft, and would be expected to be available in the next three years if similar hydrologic conditions occurred again. Because the City only pumped the amount necessary during 2008-2010, it is unclear how much additional water would be available for pumping, but based on the reasons given in Section 5.1, the City expects that it could pump a significant amount of additional water in the future under similarly dry hydrologic conditions.

Water Code section 10632 also requires a discussion of actions to be undertaken to conserve water and reduce demand in response to up to a 50% reduction in supply. As explained elsewhere, the City has never had to deal with a serious shortage in its groundwater supply. However, the City expects that if such a supply emergency were ever to occur, that it would implement the following measures, which are increasingly restrictive, as necessary and appropriate:

- Publicize the supply shortage and encourage and educate all customers regarding voluntary demand reduction measures.
- Reduce or eliminate all outdoor and landscape irrigation at City properties and parks.
- Prohibit the use of potable water for street cleaning, car washing, and other such practices.
- Implement an alternating or staggered schedule (odd numbered calendar days vs. even days) for residential and commercial irrigation of outdoor landscapes.
- Prohibit all use of potable water for outdoor residential or commercial use on lawns, gardens, and other landscaping.

The above measures could be implemented in stages depending on the severity of the supply reduction. The City would constantly monitor its well production and the daily demand of its customers to judge the efficacy of imposition of each measure and whether additional measures were necessary. The City anticipates that implementation of all the above measures would reduce demand by more than 50%, especially if all outdoor watering is prohibited because the City predominantly serves residential customers and outdoor residential use constitutes a majority of the use of water in residential areas. Such measures would allow continued indoor use of water without any health or safety concerns. Because the City is largely unmetered and collects flat fees from most customers, the above measures would not be expected to cause a significant effect on revenues and rates. Once the City converts to water meters, additional measures such as tiered rate structures and penalties for overuse could be considered.

### 5.3 Water Quality

The City of Rio Vista has three wells that have arsenic levels at or above the MCL of 10 ppb. These water quality issues are being monitored, and the City engages in careful blending, if necessary, to ensure that all water supplies meet or exceed federal and state quality and safety standards. The City is currently blending two of these wells and producing water below the MCL. The third well has not been put on line since 2008 and a filtration system to remove impurities is currently being designed. These water quality issues are limited and have not impacted the City's ability to satisfy existing demands. They are also not anticipated to affect the City's ability to meet future demands from current or new wells.

### 5.4 Drought Planning

Because the groundwater basin has not been fully defined and there is no calculated groundwater budget, the nearest recorded potential water source, the Sacramento River, was used to determine the normal year, dry year and multiple dry year periods. Records of flow from the USGS Sacramento River Gauge 11447500 provides the Normal, Single Dry, and Multiple Dry year data as shown in Table 27. Unfortunately, City demand records during those periods are unavailable. Therefore, demand during drought periods is calculated as follows:

- It is assumed that under normal conditions, water demand is approximately five times the low demand in the winter. Therefore, summer water demand accounts for two-thirds of the total yearly demand.
- It is also assumed that summer demand doubles during drought conditions. This is a highly conservative assumption, as the City does not have large swaths of greenbelts or large irrigation customers.
- Using the two assumptions above results in yearly drought demand that is 33% higher than normal demand.

*See Tables 27 and 28 in Appendix E.*

The City does not currently have a Drought Contingency or Water Supply Reliability plan. As explained above, the City anticipates that its groundwater supply will be adequate to meet existing and projected demands during droughts. The City has mandatory measures that can be imposed during drought years such as reduction or elimination of landscape watering of City owned land, public schools and cemeteries. As explained above, however, the City's current focus is to convert existing water users to meters to comply with California law. Installation of water meters will enable the City to develop strategies and plans to prepare for and cope with possible drought situations. Emergency measures discussed above are not expected to be necessary, but the option for emergency infrastructure, or for direct or in lieu exchange with other water users in the SCWA service area, adds an additional margin of safety in the most extreme, unforeseeable circumstances.

## **6. Demand Management Measurement:**

Demand Management Measures are ways to conserve water through efficient tools, education, and incentives. Currently there are 14 best management practices (BMPs) that are promoted by California Urban Water Conservation Council (CUWCC). The City is not a current signatory to the California Urban Water Conservation Council, but it is considering participation in, or collaboration with, the California Urban Water Conservation Council and routinely reviews reports and recommendations issued by that organization.

Each of the BMPs promoted by CUWCC is discussed below with an indication of whether the City is currently implementing these measures. If not, a brief discussion of the feasibility of the BMP is provided. As stated above, the City's primary goal in the next five years is to convert as many existing unmetered connections to meters as possible and to repair and maintain portions of its infrastructure. Given the challenges and costs associated with these measures, the City has had to defer implementation of some other BMPs that would not provide the significant management flexibility and improvement in water use monitoring, education, and reduction as conversion to meters would.

### **6.1 Water Survey Programs for Residential Customers**

The City has not developed an independent survey program of single or multifamily residential customers to detect leaks. The City may consider beginning a water survey program to increase the visibility of the Public Works services. Such information could also be supplied as a leaflet in the monthly water bill. The City is currently evaluating options, but is also mindful of the additional costs of implementing such a program.

### **6.2 Residential Plumbing Retrofit**

The City will be adopting the 2010 California Green Building Standards Code, and the 2010 California Plumbing Code, which specify various mandatory water conservation measures for residential uses including 1.28 gallon water closets and 0.5 gallon urinals after July 1, 2011.

### **6.3 System Water Audits**

The City has an active SCADA system monitoring the City's water well activity and other parameters. City employees are also highly knowledgeable about the existing system. The City has been retrofitting the existing residential meters that have been installed in the newer subdivisions. Staff has begun reading meters, logging data, and billing those accounts. Additionally, the City has been successful in continually detecting and repairing leaking water mains in a timely fashion to assist in conservation and consistent water deliveries.

### **6.4 Commodity Rate Metering**

The City has just recently purchased a meter reading system to begin reading existing meters, and is in the process of implementing this new system. As stated above, the City is anticipating installation of new meters to customers who in the past had none. This was due, in part, to the recommendations of the 2003 Water Master Plan.

## **6.5 Large Landscape Conservation**

On March 19, 2009, the City Council adopted Ordinance No. 643, adopting a water conservation and landscape ordinance to achieve water conservation through proper plant selection, installation and maintenance practices for landscaping associated with new commercial, industrial, institutional, mixed-use, common areas, multiple family, and new single family dwellings.

## **6.6 High Efficiency Washing Machines**

The City may consider participating in a regional program that provides Residential High-Efficiency Clothes Washer Vouchers. The City is investigating its options and the potential for participation.

## **6.7 Public Information Program**

The City provides information to the public on a regular basis through the use of the City's internet homepage, mailings, and public meetings.

## **6.8 School Education Programs**

The City does not have a School Education program at this time. During these difficult fiscal times, the City has had to prioritize available funding and has directed funds collected from water user rates to more important and critical objectives such as repair, maintenance and monitoring.

## **6.9 Conservation Programs for Commercial, Industrial, and Institutional Accounts**

On March 19, 2009, the City Council adopted Ordinance No. 643, adopting a water conservation and landscape ordinance to achieve water conservation through proper plant selection, installation and maintenance practices for landscaping associated with new commercial, industrial and institutional uses.

## **6.10 Conservation Pricing**

The City does not have a Conservation Pricing program. Implementation of such a program is currently infeasible and would be ineffective because the majority of the City's water users are not metered. The City will convert these users to meters – a process that the City expects to complete by 2015. Once all users are on meters as required by California law, then the City will consider conservation pricing options.

## **6.11 Wholesale Agency Programs**

The City is not a Wholesale Agency.

#### **6.12 Water Conservation Coordinator**

Rio Vista's Planning Division reviews all new landscape plans for compliance with the City's water conservation and landscape ordinance, and inspects the landscaping for conformance with the approved plans. This review program has been a cost effective way for the City to reduce demands and encourage water conservation.

#### **6.13 Waste Water Prohibition**

The City does not have a Waste Water Prohibition Program.

#### **6.14 Residential Plumbing Retrofit**

The City will be adopting the 2010 California Green Building Standards Code, and the 2010 California Plumbing Code, which specify various mandatory water conservation measures for residential uses including 1.28 gallon water closets and 0.5 gallon urinals after July 1, 2011.

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# City of Rio Vista 2010 UWMP

## APPENDIX A

- Contact Correspondence
- Supporting Documentation
- Resolution to Adopt the 2010 UWMP

# City of Rio Vista 2010 UWMP

## APPENDIX B

- Sacramento Valley Groundwater Basin and Solano Subbasin  
(DWR Bulletin 118)

## **Sacramento Valley Groundwater Basin**

### **Solano Subbasin**

Groundwater Basin Number: 5-21.66

County: Solano, Sacramento, Yolo

Surface Area: 425,000 acres (664 square miles)

#### **Basin Boundaries and Hydrologic Features**

The Solano Subbasin lies in the southwestern portion of the Sacramento Basin and the northern portion of the Sacramento-San Joaquin Delta. The elevation varies from 120 feet in the northwest corner to sea level in the south. Subbasin boundaries are defined by; Putah Creek on the north, the Sacramento River on the East (from Sacramento to Walnut Grove), the North Mokelumne River on the southeast (from Walnut Grove to the San Joaquin River), and the San Joaquin River on the South (from the North Mokelumne River to the Sacramento River). The western subbasin border is defined by the hydrologic divide that separates lands draining to the San Francisco Bay from those draining to the Sacramento-San Joaquin River Delta. That divide is roughly delineated by the English Hills and the Montezuma Hills.

Primary waterways in and bordering the basin include the Sacramento, Mokelumne and San Joaquin Rivers, the Sacramento River Deep Water Ship Channel, and Putah Creek.

Annual precipitation averages in the basin range from approximately 23 inches in the western portion of the subbasin to 16 inches in the eastern portion of the basin.

#### **Hydrogeologic Information**

##### ***Water Bearing Formations***

The primary water-bearing formations comprising the Solano subbasin are sedimentary continental deposits of Late Tertiary (Pliocene) to Quaternary (Recent) age. Fresh water-bearing units include younger alluvium, older alluvium, and the Tehama Formation (Thomasson and others 1960). The units pinch out near the Coast Range on the west and thicken to a section of nearly 3000 feet near the eastern margin of the basin. Saline water-bearing sedimentary units underlie the Tehama formation and are generally considered the saline water boundary (adapted from Thomasson and others, 1960).

Flood basin deposits occur along the eastern margin of the subbasin. These deposits consist primarily of silts and clays, and may be locally interbedded with stream channel deposits of the Sacramento River. In the delta, flood basin deposits contain a significant percentage of organic material (peat), and are sometimes mapped as peaty mud (Wagner and others 1987). Thickness of the unit ranges from 0 to 150 feet. The flood basin deposits have low permeability and generally yield low quantities of water to wells. Recent stream channel deposits consist of unconsolidated silt, fine- to medium-grained sand, gravel and in some cases cobbles deposited in and adjacent to active streams in the subbasin. They occur along the Sacramento, Mokelumne and San Joaquin Rivers, and the upper reaches of Putah Creek.

Thickness of the younger alluvium ranges from 0 to 40 feet, however with the exception of the Delta, they generally lie above the saturated zone.

Older alluvium consists of loose to moderately compacted silt, silty clay, sand, and gravel deposited in alluvial fans during the Pliocene and Pleistocene. Thickness of the unit ranges from 60 to 130 feet, about one-quarter of which is coarse sand and gravel generally found as lenses within finer sands, silts, and clays. Permeability of the older alluvium is highly variable. Wells penetrating sand and gravel lenses of the unit produce between 300 and 1000 gpm. Adjacent to the Sacramento River, wells completed in ancestral Sacramento River stream channel deposits yield up to 4000 gpm. Wells completed in the finer-grained portions of the older alluvium produce between 50 and 150 gpm.

The Tehama Formation is the thickest water-bearing unit underlying the Solano subbasin, ranging in thickness from 1500 to 2500 feet. Surface exposures of the Tehama Formation are limited mainly to the English Hills along the western margin of the basin. It consists of moderately compacted silt, clay, and silty fine sand enclosing lenses of sand and gravel, silt and gravel, and cemented conglomerate. Permeability of the Tehama Formation is variable, but generally less than the overlying younger units. Because of its relatively greater thickness, however, wells completed in the Tehama can yield up to several thousand gpm.

Underlying the Tehama Formation are brackish to saline water-bearing sedimentary units including the somewhat brackish sedimentary rocks of volcanic origin (Pliocene to Oligocene?) underlain by undifferentiated marine sedimentary rocks (Oligocene? to Paleocene). These units are typically of low permeability and contain connate water. The upper contact of these units generally coincides with the fresh/saline water boundary at depths as shallow as a few hundred feet near the Coast Range on the west to nearly 3000 feet near the eastern margin of the basin (Berkstresser and others 1973).

### ***Groundwater Level Trends***

Groundwater levels were measured at what we now consider to be natural, predevelopment levels in 1912 by the USGS. At that time the general direction of groundwater flow in this subbasin was from northwest to southeast. From 1912 to 1932, below-average precipitation resulted in lower groundwater levels throughout the basin. Due to above-average precipitation from 1932 and 1941 groundwater levels recovered slightly in spite of increased groundwater development. After 1941, groundwater levels continued to decline due to increasing agricultural and urban development, reaching their lowest historical levels in the late 1950s. A large pumping depression between Davis and Dixon was one of the more notable groundwater level depressions in the subbasin. Surface water deliveries from the Solano Project beginning in 1959 caused groundwater levels to rise slightly or slow their descent. Since this time, groundwater level trends within the Solano subbasin have been impacted by drought periods in the mid-1970s and late-1980s but have recovered quickly in the following "wet" years. (This discussion is taken largely from California Department of Water Resources, 1994.)

### **Groundwater Storage**

**Groundwater Storage Capacity.** To date, there has been no groundwater storage calculation for the Solano subbasin as it is described by Bulletin 118. The USGS, however, has determined specific yield averages and groundwater storage calculations for some areas within and around the Solano subbasin (Thomasson and others 1960).

**Groundwater in Storage.** (see above)

### **Groundwater Budget (Type C)**

Currently no groundwater budget has been calculated for the Solano Subbasin.

### **Groundwater Quality**

**Characterization.** This discussion of groundwater quality is based on USGS Water Supply Investigation Report 84-4244 (Evenson, 1985) except where noted.

Groundwater within the Solano subbasin is considered to be of generally good quality, and useable for both domestic and agricultural purposes. Chemical water types within the basin are variable and classified generally as magnesium bicarbonate in the central and northern areas, sodium bicarbonate in the southern and eastern areas, and calcium magnesium or magnesium calcium bicarbonate around and west of Dixon. Total dissolved solids (TDS) range from between 250 and 500 ppm in the northwest and eastern portion of the basin and are found at levels higher than 500 ppm in the central and southern areas. (Evaluation of data from the Department of Health Services (Department of Health Services, 2000) shows the TDS minimum = 150 ppm, maximum = 880 ppm, average = 427 ppm). In general, most of the water within the subbasin is classified as hard to very hard (see below).

Chloride concentrations are found over 100 ppm in the southern areas, while sulfate concentration is greater than 50 ppm in the southern areas. The maximum contaminant level (MCL) for both chloride and sulfate is 600 ppm.) Boron concentrations are less than 0.75 ppm except in the southern and southeastern basin where concentrations average between 0.75 and 2.0 ppm (more than 1.0 ppm will affect sensitive tree crops).

Iron concentrations increase toward the eastern side of the subbasin, from less than 0.02 ppm to greater than 0.05 ppm (MCL = 0.3 ppm) along the Sacramento River, while manganese concentrations also increase from west to east with concentrations from .01 ppm to over 0.1 ppm (MCL = 0.050 ppm) found north of Rio Vista and east of the Solano-Yolo County line.

**Impairments.** Overall hardness (as  $\text{CaCO}_3$ ) is generally greater than 180 ppm. Approximately one half of drinking water well samples taken between 1970 and 2000 analyzed for overall hardness measured above 200 ppm, but

rarely over 400 ppm (Department of Health Services 2000). High concentrations of bicarbonate which cause precipitation of Ca and Mg carbonates is found in the southern portion of the basin.

Arsenic concentrations are typically between 0.02 and 0.05 ppm, with the highest concentrations found along the southeastern margin of the basin. Although this is currently not considered problematic, there could be impacts if the MCL is lowered. The current MCL (as set by the EPA) for arsenic is 0.05 ppm. Also, manganese (a secondary constituent) is found at concentrations above the MCL of 0.05 ppm along the Sacramento River along the eastern portion of the subbasin.

### Water Quality in Public Supply Wells

Constituent Group <sup>1</sup>	Number of wells sampled <sup>2</sup>	Number of wells with a concentration above an MCL <sup>3</sup>
Inorganics – Primary	71	1
Radiological	41	0
Nitrates	96	8
Pesticides	56	3
VOCs and SVOCs	57	1
Inorganics – Secondary	71	17

<sup>1</sup> A description of each member in the constituent groups and a generalized discussion of the relevance of these groups are included in *California's Groundwater – Bulletin 118* by DWR (2003).

<sup>2</sup> Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.

<sup>3</sup> Each well reported with a concentration above an MCL was confirmed with a second detection above an MCL. This information is intended as an indicator of the types of activities that cause contamination in a given basin. It represents the water quality at the sample location. It does not indicate the water quality delivered to the consumer. More detailed drinking water quality information can be obtained from the local water purveyor and its annual Consumer Confidence Report.

### Well Characteristics

#### Well yields (gal/min)

Currently there is insufficient data to provide statistics on water well yields.

#### Total depths (ft) <sup>1</sup>

Domestic	Range: 38 to 1070 ft	Average: 239 ft
Municipal/Irrigation	Range: 62 to 2275 ft	Average: 510 ft

<sup>1</sup> Based on DWR well completion report data from 2001.

### Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
DWR	Groundwater levels	35 semi-annually 7 monthly
Solano ID		7 semi-annually 2 monthly
USBR		60 semi-annually 12 monthly
DWR	Miscellaneous water quality	23
Department of Health Services and cooperators	Title 22 water quality	136

### Basin Management

Groundwater management:	City of Vacaville adopted AB3030 plan in 2/95 Maine Prairie Water District adopted AB3030 plan in 1/97 Reclamation District #2068 adopted AB3030 plan in 1/97 Solano Irrigation District adopted AB3030 plan in 2/95
Water agencies	
Public	City of Dixon City of Rio Vista California Water Service City of Vacaville University of California, Davis
Private	Maine Prairie Water District Solano Irrigation District Solano County Water Agency North Delta Water Agency Reclamation District #501 Reclamation District #536 Reclamation District #1607 Reclamation District #1667 Reclamation District #2060 Reclamation District #2068 Reclamation District #2084 Reclamation District #2093 Reclamation District #2098 Reclamation District #2104 Reclamation District #2112

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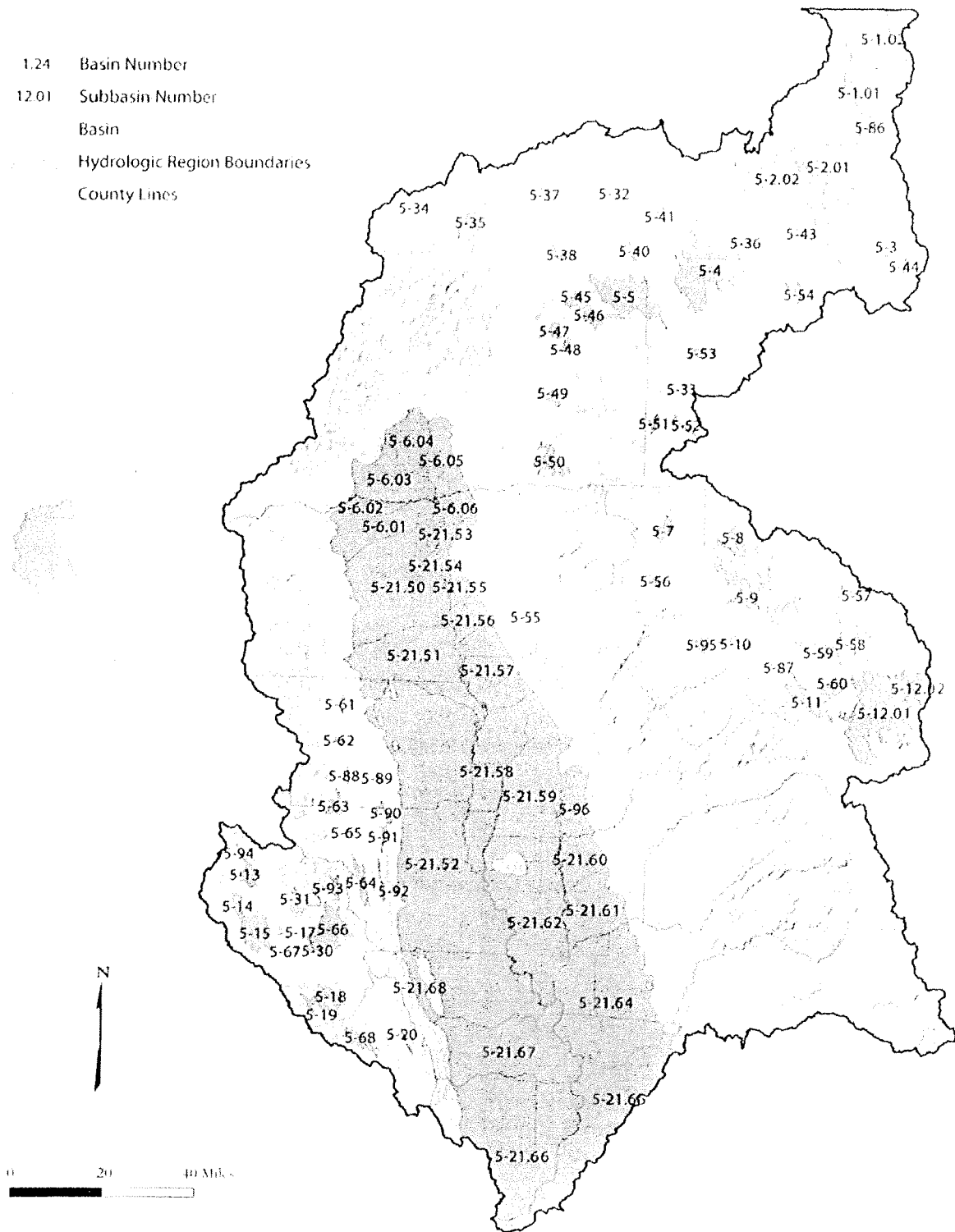
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### Errata

Changes made to the basin description will be noted here.

- 1.24 Basin Number
- 12.01 Subbasin Number
- Basin
- Hydrologic Region Boundaries
- County Lines



Sacramento River Hydrologic Region



**RESOLUTION 2011-XX**

**WATER SHORTAGE CONTINGENCY RESOLUTION  
OF THE CITY COUNCIL OF THE CITY OF RIO VISTA**

**WHEREAS**, the City of Rio Vista (City) delivers drinking water to its customers and currently relies entirely on groundwater from the Solano subbasin for that supply;

**WHEREAS**, while the City does not expect the availability of the groundwater supply for the City to be limited during times of drought or other emergency conditions, the California Urban Water Management Act requires consideration of emergency measures to achieve a reduction in water use consistent with up to a 50 percent supply reduction;

**WHEREAS**, if such an event were to occur, the City should be prepared to implement and require its residents to implement actions to achieve such reduction and to conserve supplies;

**NOW, THEREFORE, BE IT RESOLVED** that if the City ever encounters a 50 percent reduction in water supply or some other reduction in supply that causes a serious concern as to the adequacy of the City's supply, the following actions will be considered for implementation by the City:

- 1) Voluntary demand reduction measures will be publicized and urged.
- 2) Street cleaning with potable water will be prohibited.
- 3) City landscapes and parks will cease outdoor irrigation.
- 4) Residential customers' outdoor landscape irrigation will be limited to alternating days.
- 5) Residential customers' outdoor landscape irrigation will be prohibited.

These and any other applicable and appropriate measures will be imposed and adopted by the City Council when and if necessary, depending on the most recent data, if such a need ever arises.

**PASSED, APPROVED AND ADOPTED** this \_\_\_\_\_ day of \_\_\_\_\_, 20XX.

ATTEST: \_\_\_\_\_  
Name, Board President

ATTEST: \_\_\_\_\_  
Name, Board Secretary/Treasurer

# City of Rio Vista 2010 UWMP

## APPENDIX C

- Antioch Pump Plant 3, California Period of Record Monthly Climate Summary
- N.O.A.A. California Precipitation Graph

# ANTIOCH PUMP PLANT 3, CALIFORNIA (040232)

## Period of Record Monthly Climate Summary

Period of Record : 3/1/1955 to 12/31/2005

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	53.7	60.2	65.3	71.4	78.5	86.0	91.1	90.0	86.2	77.6	64.2	54.7	73.2
Average Min. Temperature (F)	37.1	40.9	43.3	46.2	51.2	56.0	57.3	56.7	55.1	50.1	42.8	37.3	47.8
Average Total Precipitation (in.)	2.79	2.41	1.96	0.88	0.39	0.10	0.02	0.05	0.20	0.68	1.65	2.22	13.34
Average Total SnowFall (in.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average Snow Depth (in.)	0	0	0	0	0	0	0	0	0	0	0	0	0

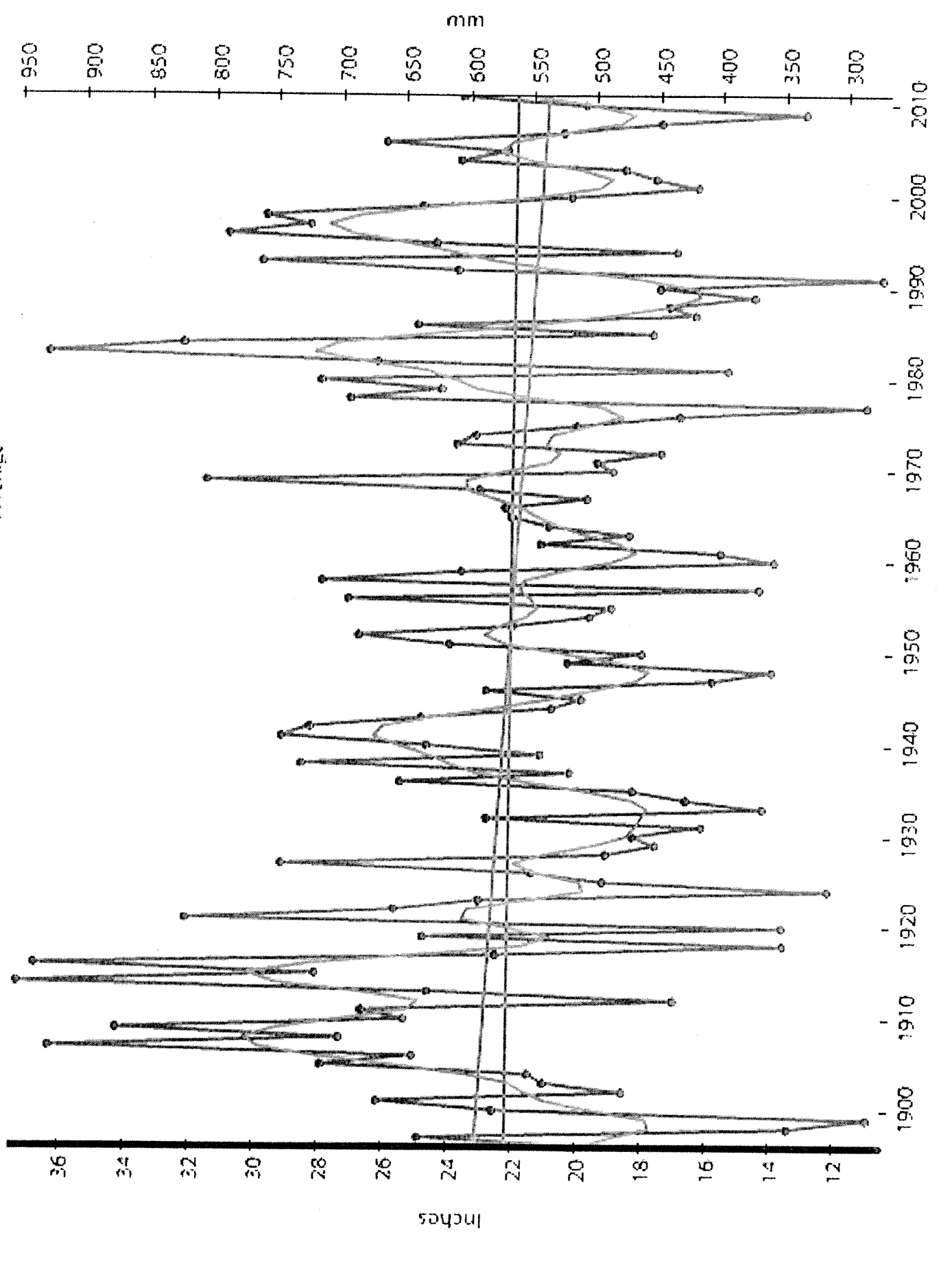
Percent of possible observations for period of record

Max. Temp.: 98% Min. Temp.: 98.4% Precipitation: 98.8% Snowfall: 99.1% Snow Depth: 99.1%

Check [Station Metadata](#) or [Metadata graphics](#) for more detail about data completeness.

Western Regional Climate Center, [wrccl@drcl.edu](mailto:wrccl@drcl.edu)

# California, Precipitation, March-February



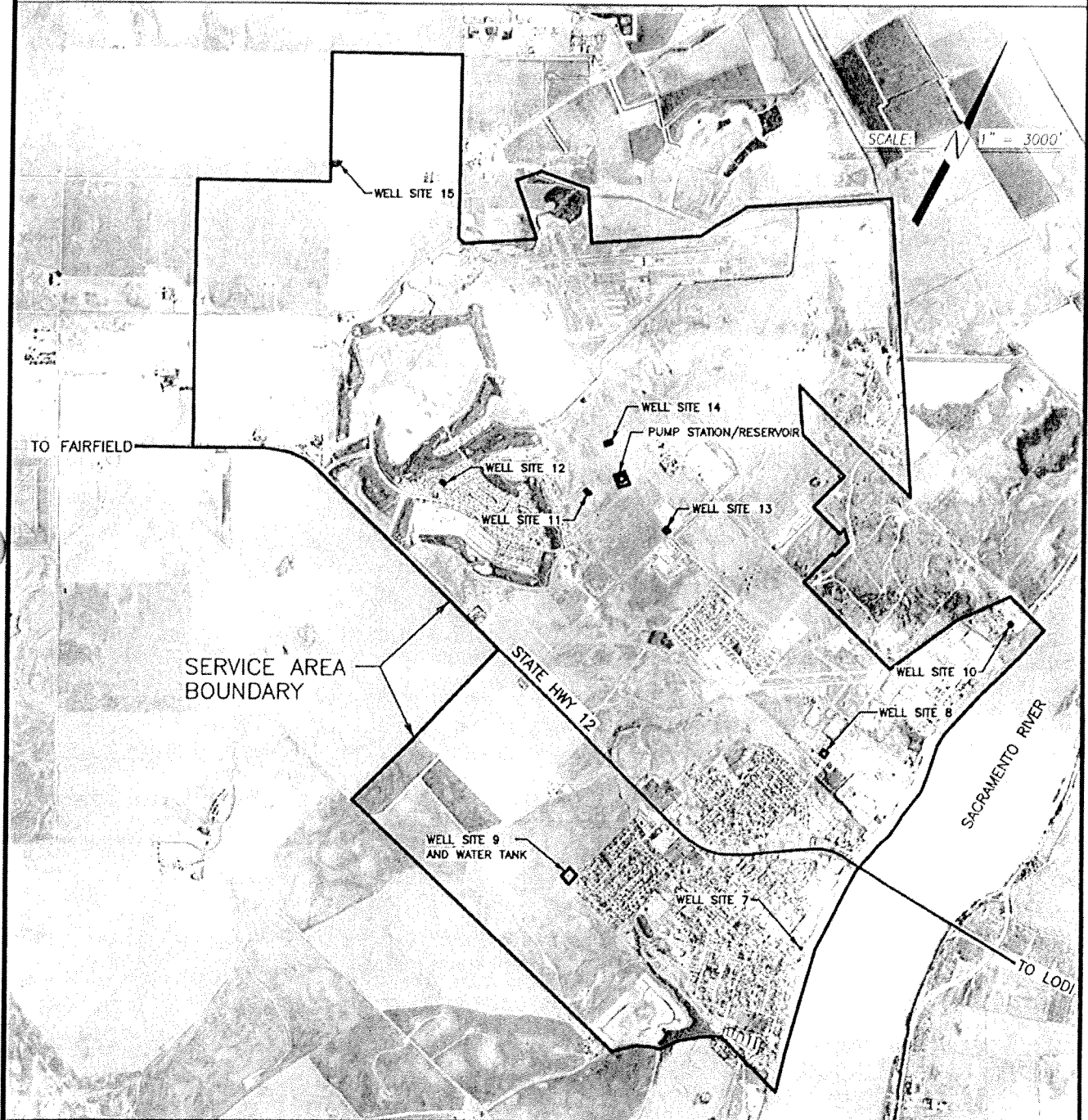
# City of Rio Vista 2010 UWMP

## APPENDIX D

- Water Service Area Map
- Population Estimate (State of California Dept of Financing)
- Urban Water Supplier Gross Water Use Calculations

# CITY OF RIO VISTA WATER SERVICE AREA

WATER SYSTEM NUMBER 4810004



R0808

Table 2: E-4 Population Estimates for Cities, Counties and State, 2001-2010  
with 2000 Benchmark

COUNTY/CITY	4/1/2000	1/1/2001	1/1/2002	1/1/2003	1/1/2004	1/1/2005	1/1/2005	1/1/2007	1/1/2008	1/1/2009	1/1/2010
<b>Fairfield</b>	96,178	98,050	100,606	102,534	103,343	104,113	104,960	104,859	106,192	106,194	105,955
Rio Vista	4,571	4,774	5,368	5,674	6,276	6,797	7,332	7,802	8,048	8,203	8,324
Suisun City	26,118	26,523	26,805	26,954	27,430	27,553	27,583	27,831	28,043	28,785	28,962
Vacaville	88,642	90,770	92,802	94,215	96,121	96,222	96,879	96,025	96,441	96,235	97,305
Valejo	117,148	118,380	119,753	120,485	121,148	120,522	120,394	120,790	120,466	120,765	121,435
Balance Of County	19,305	19,546	19,737	19,736	19,759	19,556	19,948	20,021	20,079	20,111	20,165
Incorporated	375,625	381,862	388,776	393,212	396,658	399,448	400,767	402,625	404,506	405,629	407,672
County Total	394,930	401,408	408,513	412,948	416,417	419,004	420,715	422,646	424,585	425,740	427,837
<b>Sonoma County</b>											
Cloverdale	6,831	7,088	7,340	7,489	7,965	8,205	8,415	8,432	8,512	8,569	8,635
Geati	6,471	6,497	6,701	6,736	6,926	7,185	7,230	7,375	7,388	7,476	7,476
Healdsburg	10,915	11,388	11,650	11,628	11,639	11,661	11,651	11,641	11,668	11,800	11,931
Petaluma	54,550	55,483	55,775	55,858	56,091	56,381	56,479	56,688	57,241	57,817	58,401
Rohnert Park	42,236	42,309	42,233	42,455	42,282	42,262	42,833	42,722	42,922	43,081	43,398
Santa Rosa	147,595	149,648	152,053	154,027	154,944	155,589	158,431	157,126	159,469	161,716	163,436
Sebastopol	7,774	7,805	7,814	7,789	7,768	7,760	7,718	7,716	7,687	7,745	7,943
Sonoma	9,275	9,507	9,483	9,580	9,721	9,792	9,947	9,887	9,911	9,984	10,078
Windor	22,744	23,553	24,130	24,425	24,867	25,359	25,889	26,280	26,471	26,714	26,955
Balance Of County	150,223	151,277	151,310	150,898	151,476	151,509	150,428	151,068	151,452	152,415	155,031
Incorporated	308,391	313,278	317,179	319,987	322,203	324,194	328,493	327,867	331,269	334,844	338,254
County Total	458,614	464,555	468,489	470,885	473,679	475,703	476,921	478,935	482,721	487,259	493,285
<b>Stanislaus County</b>											
Ceres	34,609	35,111	35,805	36,519	37,473	38,712	40,719	41,678	42,491	42,888	43,219
Hughson	3,980	4,124	4,249	4,934	5,249	5,926	6,090	6,036	6,138	6,175	6,240
Modesto	188,861	193,672	199,455	203,892	206,934	207,101	206,991	207,613	208,375	209,574	211,536
Newman	7,092	7,504	7,569	7,786	8,342	9,111	10,086	10,227	10,507	10,716	10,824
Oakdale	15,503	15,760	16,284	16,777	17,179	17,393	17,759	18,488	19,192	19,558	19,854
Patterson	11,606	12,224	13,081	13,711	14,222	16,123	19,170	20,727	21,078	21,116	21,251
Riverbank	15,826	16,194	17,074	17,312	18,264	19,935	21,100	21,330	21,595	21,753	22,201
Turlock	55,811	58,396	60,492	62,373	64,443	66,841	67,518	68,813	69,650	70,067	71,181
Waterford	6,924	7,039	7,196	7,694	7,885	7,877	8,171	8,525	8,697	8,793	8,860
Balance Of County	108,785	108,569	111,121	112,902	113,715	114,172	114,001	114,174	114,281	114,430	115,418
Incorporated	340,212	350,024	361,205	370,998	379,991	389,019	397,604	403,437	407,723	410,660	415,166
County Total	446,997	458,593	472,326	483,900	493,706	503,191	511,605	517,611	522,004	525,090	530,584
<b>Sutter County</b>											
Live Oak	6,229	6,331	6,400	6,464	6,580	6,739	7,431	8,071	8,452	8,571	8,791
Yuba City	36,758	45,598	46,846	48,504	50,987	57,959	60,146	61,650	62,671	63,647	65,372
Balance Of County	35,943	28,248	28,617	29,119	28,896	24,136	23,835	24,058	24,267	24,337	24,991
Incorporated	42,987	51,929	53,246	54,968	57,567	64,698	67,577	69,721	71,123	72,218	74,163
County Total	78,930	80,177	81,863	84,087	86,463	88,834	91,412	93,779	95,390	96,555	99,154

## URBAN RETAIL WATER SUPPLIER GROSS WATER USE CALCULATION

Utility Name:		12-month period					1-Jan to 31-Dec					Volume Units:				AF	
		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009						
Item	Calculation	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10						
	Volume from Own Sources (raw data)	1620	1645	1872	2154	2277	2197	2489	2934	3115	2467						
	Meter error adjustment (+/-)	32	33	37	43	45	44	50	59	62	49						
1	Subtotal: Corrected Volume from Own Sources	1652	1678	1909	2197	2323	2241	2539	2993	3177	2516						
	Volume from Imported Sources (raw data)	0	0	0	0	0	0	0	0	0	0						
	Meter error adjustment (+/-)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A						
2	Subtotal: Corrected Volume from Imported Sources	0	0	0	0	0	0	0	0	0	0						
3	Total Volume Into Dist. System - Item 1 + Item 2	1652	1678	1909	2197	2323	2241	2539	2993	3177	2516						
	Volume Exported to Other Utilities (raw data)	0	0	0	0	0	0	0	0	0	0						
	Meter error adjustment (+/-)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A						
4	Subtotal: Corrected Volume Exported to Other Utilities	0	0	0	0	0	0	0	0	0	0						
5	Change in Dist. System Storage (+/-)	0	0	0	0	0	0	0	0	0	0						
6	Gross Water Use Before Indirect Recycled Water Use Deductions = Item 3 - Item 4 - Item 5	1652	1678	1909	2197	2323	2241	2539	2993	3177	2516						
7	Indirect Recycled Water Use Deduction	0	0	0	0	0	0	0	0	0	0						
8	Gross Water Use Before Indirect Recycled Water Use Deductions = Item 6 - Item 7	1652	1678	1909	2197	2323	2241	2539	2993	3177	2516						
9	Water Delivered for Ag. Use (optional deduction)																
10	Process Water Use (Optional deduction)																
11	Gross Water Use Before Indirect Recycled Water Use Deductions = Item 8 - Item 9, Item 10	1652	1678	1909	2197	2323	2241	2539	2993	3177	2516						

# City of Rio Vista 2010 UWMP

## APPENDIX E

- Tables 1 - 38



Table 2 Population - current and projected						
	2010	2015	2020	2025	2030	2035-optional
Service area population <sup>1</sup>	8,324 <sup>4</sup>	10,112 <sup>3</sup>	11,900 <sup>3</sup>	13,250 <sup>3</sup>	14,600 <sup>3</sup>	See Below
<sup>1</sup> Service area population is defined as the population served by the distribution system. See Technical Methodology 2: Service Area Population (2010 UWMP Guidebook, Section M). <sup>2</sup> Provide the source of the population data provided.						

Data from:

<sup>3</sup>Assoc. Of Bay Area Gov't

<sup>4</sup>State of Calif. Dept. of Finance

Table 3 Water deliveries - actual, 2005						
2005						
	Metered		Not metered		Total	
	# of accounts	Volume	# of Accounts	Volume	Volume	Volume
Water use sectors						
Single family						
Multi-family	NDA	0	NDA	2,047	2,047	2,047
Commercial	NDA	118	NDA	0	0	118
Industrial	NDA	68	NDA	0	0	68
Institutional/governmental	NDA	0	NDA	2	2	2
Landscape	NDA	0	NDA	0	0	0
Agriculture	NDA	0	NDA	0	0	0
Other	NDA	0	NDA	6	6	6
Churches	NDA	0	NDA	0	0	0
Total	NDA	186	NDA	2,055	2,055	2,241
Units (circle one):	acre-feet per year	million gallons per year	cubic feet per year			

NDA = No Data Available

Source: City of Rio Vista

Table 4 Water deliveries - actual, 2010						
		2010				
		Metered		Not metered		Total
Water use sectors		# of accounts	Deliveries AFY	# of Accounts	Deliveries AFY	Volume
Single family		0	0			
Multi-family						
Commercial		207	123	3,717	2,217	2,217
Industrial		119	71	0	0	71
Institutional/governmental		0	0	3	2	2
Landscape		0	0	0	0	0
Agriculture		0	0	0	0	0
Other		0	0	9	6	6
Total		326	194	3,729	2,225	2,419
Units (circle one):		acre-feet per year	million gallons per year	cubic feet per year		

Source: City of Rio Vista

Table 5 Water deliveries - projected, 2015						
2015						
Water use sectors	Metered		Not metered		Total	
	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	Volume	
Single family	4,515	2,681	0	0	0	2,681
Multi-family	252	142	0	0	0	142
Commercial	144	85	0	0	0	85
Industrial	4	2	0	0	0	2
Institutional/governmental	0	0	0	0	0	0
Landscape	0	0	0	0	0	0
Agriculture	0	0	0	0	0	0
Other	11	6	0	0	0	6
<b>Total</b>	<b>4,926</b>	<b>2,916</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2,916</b>
Units (circle one):      acre-feet per year      million gallons per year      cubic feet per year						

Note: The 2015 projections are based on the average of the 2020 and 2010 demands divided by 2.

Table 6 Water deliveries - projected, 2020						
2020						
Water use sectors	Metered		Not metered		Total	
	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	Volume	
Single family						
Multi-family	5,313	3,126	0	0		3,126
Commercial	296	174	0	0		174
Industrial	170	100	0	0		100
Institutional/governmental	5	3	0	0		3
Landscape	0	0	0	0		0
Agriculture	0	0	0	0		0
Other	13	9	0	0		9
<b>Total</b>	<b>5,797</b>	<b>3,412</b>	<b>0</b>	<b>0</b>		<b>3,412</b>
Units (circle one):      acre-feet per year      million gallons per year      cubic feet per year						

Note: Based on projections for 2020 including the 20% reduction.

Table 7 Water deliveries - projected 2025, 2030, and 2035									
	2025			2030			2035- optional		
	metered			metered			metered		
Water use sectors	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	# of accounts	metered	Deliveries AFY
Single family									
Multi-family	5,917	3,381			6,520	3,722			
Commercial	329	302			363	334			
Industrial	189	105			208	116			
Institutional/governmental	5	4			6	5			
Landscape	0	0			0	0			
Agriculture	0	0			0	0			
Other	15	7			16	9			
<b>Total</b>	<b>6,455</b>	<b>3,799</b>			<b>7,113</b>	<b>4,186</b>			
Units (circle one):	acre-feet per year	million gallons per year	cubic feet per year						

Note: Based on projections including reductions.

Table 8 Low-income projected water demands						
	2015	2020	2025	2030	2035-opt	
	metered		metered		metered	
Low-income Water Demands <sup>1</sup>	# of accounts	Deliveries AFY	# of accounts	Deliveries AFY	# of accounts	
Single family	NDA	NDA	NDA	NDA		
Multi-family	NDA	NDA	NDA	NDA		
Total						
Units (circle one):    acre-feet per year    million gallons per year    cubic feet per year						
<sup>1</sup> Provide demands either as directly estimated values or as a percent of demand.						

NDA = No Data Available

Table 9 Sales to other water agencies									
Water distributed		2005	2010	2015	2020	2025	2030	2035-opt	
Name of Agency									
Name of Agency									
Name of Agency									
Total									
Units (circle one):    acre-feet per year    million gallons per year    cubic feet per year									

**NOTE:** Rio Vista is not a wholesale Water Distributor and does not plan to undertake a role in wholesale distribution.



Table 11 Total water use							
Water use	2005	2010	2015	2020	2025	2030	2035-opt
Total water use deliveries (from Tables 3 to 7)	2,241	2,419	2,916	3,412	3,799	4,186	
Sales to other water agencies (from Table 9)	0	0	0	0	0	0	
Additional water uses and losses (from Table 10)	0	0	0	0	0	0	
<b>Total</b>	<b>2,241</b>	<b>2,419</b>	<b>2,916</b>	<b>3,412</b>	<b>3,799</b>	<b>4,186</b>	
<b>Units (circle one):</b> <i>acre-feet per year</i> <i>million gallons per year</i> <i>cubic feet per year</i>							

Projections based on the 20% reduction by 2020. Other numbers per City of Rio Vista records.

**Table 12**  
**Retail agency demand projections provided to wholesale suppliers**

Wholesaler	Contracted Volume	2010	2015	2020	2025	2030	2035-opt
None	0	0	0	0	0	0	

City of Rio Vista does not import/export water

Table 13 Based period ranges			
Base	Parameter	Value	Units
10-to 15-year base period	<b>2008 total water deliveries</b>		
	2008 total volume of delivered recycled water	3,177	see below
	2008 recycled water as a percent of total deliveries	0	see below
	Number of years in base period <sup>1</sup>	0	percent
	Year beginning base period range	10	years
	Year ending base period range	2000	
5-year base period	Number of years in base period	2009 <sup>3</sup>	
	Year beginning base period range	5	years
	Year ending base period range	2005	
		2009 <sup>2</sup>	
<b>Units (circle one):    acre-feet per year    million gallons per year    cubic feet per year</b>			
<sup>1</sup> If the 2008 recycled water percent is less than 10 percent, then the first base period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent greater, the first base period is a continuous 10- to 15-year period.			
<sup>2</sup> The ending year must be between December 31, 2004 and December 31, 2010.			
<sup>3</sup> The ending year must be between December 31, 2007 and December 31, 2010.			

Table 14 Base daily per capita water use - 10 - to 15-year period					
Base period year		Distribution System Population	Daily system gross water use (mgd)	Annual daily per capita water use (gpcd)	
Sequence Year	Calendar Year				
Year 1	2000	4,571	1.47	323	
Year 2	2001	4,774	1.50	314	
Year 3	2002	5,368	1.70	317	
Year 4	2003	5,674	1.96	346	
Year 5	2004	6,276	2.07	330	
Year 6	2005	6,797	2.00	294	
Year 7	2006	7,332	2.27	309	
Year 8	2007	7,802	2.67	342	
Year 9	2008	8,048	2.84	352	
Year 10	2009	8,203	2.25	274	
Year 11					
Year 12					
Year 13					
Year 14					
Year 15					
Base Daily Per Capita Water Use <sup>1</sup>				320	
Units (circle one): acre-feet per year    millions gallons per year    cubic feet per year					
<sup>1</sup> Add the values in the column and divide by the number of rows.					

Table 15 Base daily per capita water use -- 5 year range				
Base period year		Distribution System Population	Daily system gross water use (mgd)	Annual daily per capita water use (gpcd)
Sequence Year	Calendar Year			
Year 1	2005	6797	2.00	294
Year 2	2006	7332	2.27	309
Year 3	2007	7802	2.67	342
Year 4	2008	8048	2.84	353
Year 5	2009	8203	2.25	274
		Base Daily Per Capita Water Use <sup>1</sup>		
		314		
Units (circle one):		acre-feet per year	million gallons per year	cubic feet per year
<sup>1</sup> Add the values in the column and divide by the number of rows.				



Table 17 Wholesale supplies - existing and planned sources of water						
Wholesale sources <sup>1,2</sup>	Contracted Volume <sup>3</sup>	2015	2020	2025	2030	2035 - opt
(Source 1) N/A	0	0	0	0	0	0
Units (circle one): acre-feet per year    million gallons per year    cubic feet per year						
<sup>1</sup> Water volumes presented here should be accounted for in Table 16.						
<sup>2</sup> If the water supplier is a wholesaler, indicate all customers (excluding individual retail customers) to which water is sold. If the water supplier is a retailer, indicate each wholesale supplier.						
<sup>3</sup> Indicate the full amount of water. N/A						

**NOTE:** Rio Vista does not purchase water and does not anticipate doing so.

Table 18 Groundwater -- volume pumped						
Basin name(s)	Metered or Unmetered	2006	2007	2008	2009	2010
Sacramento Valley	Metered	2,539	2,993	3,177	2,516	2,419
Groundwater as a percent of total water supply		100%	100%	100%	100%	100%
Units (circle one):	acre-feet per year	million gallons per year	cubic feet per year			
<sup>1</sup> Indicate whether volume is based on volumetric meter data of another method.						

All volumes based on Volumetric data.

Table 19 Groundwater -- volume projected to be pumped					
Basin name(s)	2015	2020	2025	2030	2035-opt
Sacramento Valley-Solano Subbasin	2,916	3,412	3,799	4,186	
Percent of total water supply	100%	100%	100%	100%	

Table 20 Transfer and exchange opportunities				
Transfer agency	Transfer or exchange	Short term or long term	Proposed Volume	
Solano Co. Water Agency	Transfer	Short	1,500	
Total			1,500	
Units (circle one):	acre-feet per year	million gallons per year	cubic feet per year	

## BEACH WWTP

Urban Water Management Plan  
June 20, 2011

Table 21 Recycled water -- wastewater collection and treatment						
Type of Wastewater	2005	2010	2015	2020	2025	2035-opt
Wastewater collected & treated in service area	158.775	164.615	182.5			
Volume that meets recycled water standard	0	0	0			
Units (circle one):	acre-feet per year	million gallons per year	cubic feet per year			

### NOTE:

plant effluent does not meet recycle water standards and there is no infrastructure available to provide the water for recycle.

## NORTHWEST WWTP

Table 21 Recycled water -- wastewater collection and treatment						
Type of Wastewater	2005	2010	2015	2020	2025	2035-opt
Wastewater collected & treated in service area	63.875	70.81	80.3			
Volume that meets recycled water standard	0	0	0			
Units (circle one):	acre-feet per year	million gallons per year	cubic feet per year			

### NOTE:

plant effluent meets recycle water standard but the level of redundancy in processes does not, and there is limited infrastructure available to provide recycled water for use.

All data provided by Veolia.

Table 22 Recycled water -- non-recycled wastewater disposal								
Method of disposal	Treatment Level	2010	2015	2020	2025	2030	2035-opt	
Pumped to River		722.4	NDA	NDA	NDA	NDA		
<b>Total</b>		722.4						
Units (circle one):      acre-feet per year      million gallons per year      cubic feet per year								

NDA = No Data Available

Data provided by Veolia.



Table 24 Recycled water -- 2005 UWMP use projection compared to 2010 actual		
User type	2010 actual use	2005 Projection for 2010 <sup>1</sup>
Agricultural irrigation	0	0
Landscape irrigation <sup>2</sup>	0	0
Commercial irrigation <sup>3</sup>	0	0
Golf course irrigation	0	0
Wildlife habitat	0	0
Wetlands	0	0
Industrial reuse	0	0
Groundwater recharge	0	0
Seawater barrier	0	0
Geothermal/Energy	0	0
Indirect potable reuse	0	0
Other (user type)	0	0
Other (user type)	0	0
<b>Total</b>	<b>0</b>	<b>0</b>
Units (circle one): acre-feet per year    million gallons per year    cubic feet per year		
<sup>1</sup> From the 2005 UWMP. There has been some modification of use types. Data from the 2005 UWMP can be left in the existing categories or modified to the new categories, at the discretion of the water supplier.		
<sup>2</sup> Includes parks, schools, cemeteries, churches, residential, or other public facilities.		
<sup>3</sup> Includes commercial building use such as landscaping, toilets, HVAC, etc. and commercial uses (car washes, laundries, nurseries, etc.)		

**NOTE:** Recycled water was not used in 2005 nor 2010. Usage of recycled water is not anticipated due to cost prohibitions.

**Table 25**  
**Methods to encourage recycled water use**

Actions	Projects Results					
	2010	2015	2020	2025	2030	2035-opt
Financial incentives						
None at this time						
<b>Total</b>						

Units (circle one):    acre-feet per year    million gallons per year    cubic feet per year

Table 26 Future water supply projects									
Project name <sup>1</sup>	Project start date	Projected completion date	Potential project constraints <sup>2</sup>	Normal-year supply <sup>3</sup>	Single-dry year supply <sup>3</sup>	Multiple-dry year first year supply <sup>3</sup>	Multiple-dry year second year supply <sup>3</sup>	Multiple-dry year third year supply <sup>3</sup>	
Additional Wells	unknown	unknown	dependant on development						
Units (circle one): acre-feet per year    million gallons per year    cubic feet per year									
<sup>1</sup> Water volumes presented here should be accounted for in Table 16.									
<sup>2</sup> Indicate whether project is likely to happen and what constraints, if any, exist for project implementation.									
<sup>3</sup> Provide estimated supply benefits, if available.									

No future water project anticipated at this time.

Table 27 Basis of water year data		
Water Year Type	Base Year(s)	
Average Water Year	2002	
Single-Dry Year	2003	
Multiple-Dry Water Years	2007-2008	

Source: N.O.A.A.

Table 28 Supply reliability - historic conditions					
Average / Normal Water Year	Single Dry Year	Multiple Dry Water Years			
		Year 1	Year 2	Year 3	Year 4
294 GPCD (2005)	346 GPCD (2003)	342 GPCD (2007)	352 GPCD (2008)	273 GPCD (2009)	
Percent of Average/Normal Year:	1.18%	1.16%	1.20%	0.92%	



Table 30 Water quality - current and projected water supply impacts									
Water source	Description of condition	2010	2015	2020	2025	2030	2035 - opt		
Well #10	Currently in design for filtration	No Data	No Impact						
Units (circle one):									
		acre-feet per year	million gallons per year	cubic feet per year					

Table 31 Supply reliability - current water sources				
Water supply sources <sup>1</sup>	Average / Normal Water Year Supply <sup>2</sup>	Multiple Dry Water Year Supply <sup>2</sup>		
		Year 2011	Year 2012	Year 2013
Supplier Produced Groundwater	1,909	3,349	3,482	3,614
Percent of normal year:	100%	133%	133%	133%
Units (circle one):		acre-feet per year	million gallons per year	cubic feet per year
<sup>1</sup> From Table 16.				
<sup>2</sup> See Table 27 for basis of water type years.				

Supply and demand comparison - normal year

	2015	2020	2025	2030	2035 - opt
Supply totals (From Table 16)	2,916	3,412	3,799	4,186	
Demand totals (From Table 11)	2,916	3,412	3,799	4,186	
Difference	0	0	0	0	
Difference as % of Supply	100%	100%	100%	100%	
Difference as % of Demand	100%	100%	100%	100%	
Units are in acre-feet per year.					

Table 33 Supply and demand comparison - single dry year					
	2015	2020	2025	2030 - opt	2035
Supply totals <sup>1</sup>	2,916	3,412	3,799		
Demand totals <sup>2,3,4</sup>	3,178	3,719	4,226		
Difference	262	307	427		
Difference as % of Supply	9%	9%	12%		
Difference as % of Demand	8%	8%	10%		
Units are in acre-feet per year.					
<sup>1</sup> Consider the same sources as in Table 16. If new sources of water are planned, add a column to the table and specify the source, timing, and amount of water.					
<sup>2</sup> Provide in the text of the UWMP text that discusses how single-dry year water supply volumes were determined.					
<sup>3</sup> Consider the same demands as in Table 3. If new water demands are anticipated, add a column to the table and specify the source, timing, and amount of water.					
<sup>4</sup> The urban water target determined in this UWMP will be considered when developing the 2020 water demands included in this table.					

All demands are based on the 20% reduction by 2020.

Table 34  
Supply and demand comparison - multiple dry-year events

		2010	2015	2020	2025	2030	2035 - opt
Multiple-dry year first year supply	Supply totals <sup>1,2</sup>	2,519	2,916	3,412	3,799	4,263	
	Demand totals <sup>2,3,4</sup>	2,922	3,383	3,958	4,407	4,945	
	Difference	403	467	546	608	682	
	Differences as % of Supply	16%	16%	16%	16%	16%	
	Differences as % of Demand	14%	14%	14%	14%	14%	
Multiple-dry year second year supply	Supply totals <sup>1,2</sup>	2,613	3,015	3,490	3,876	4,340	
	Demand totals <sup>2,3,4</sup>	3,136	3,618	4,188	4,651	5,208	
	Difference	523	603	698	775	868	
	Differences as % of Supply	20%	20%	20%	20%	20%	
	Differences as % of Demand	17%	17%	17%	17%	17%	
Multiple-dry year third year supply	Supply totals <sup>1,2</sup>	2,716	3,115	3,567	3,954	4,417	
	Demand totals <sup>2,3,4</sup>	2,499	2,867	3,282	3,638	4,064	
	Difference	217	248	285	316	353	
	Differences as % of Supply	8%	8%	8%	8%	8%	
	Differences as % of Demand	9%	9%	9%	9%	9%	

Units are in acre-feet per year.

<sup>1</sup> Consider the same sources as in Table 16. If new sources of water are planned, add a column to the table and specify the source, timing, and amount of water.

<sup>2</sup> Provide in the text of the UWMP text that discusses how single-dry year water supply volumes were determined.

<sup>3</sup> Consider the same demands as in Table 3. If new water demands are anticipated, add a column to the table and specify the source, timing, and amount of water.

<sup>4</sup> The urban water target determined in this UWMP will be considered when developing the 2020 water demands included in this table.



Table 36 Water shortage contingency -- mandatory prohibitions	
Examples of Prohibitions	Stage When
Using potable water for street washing	
Reduced Irrigation at parks, schools, and landscape areas	
Water use restriction days	
Other (name prohibition)	
Other (name prohibition)	
Other (name prohibition)	
Other (name prohibition)	



